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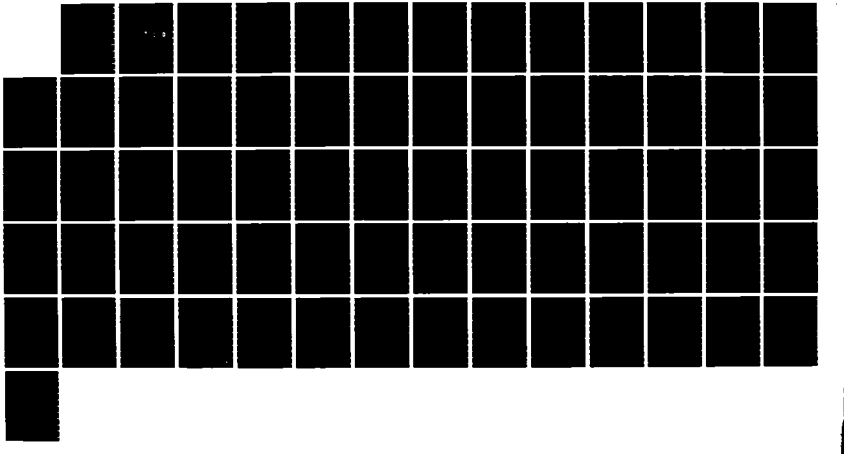

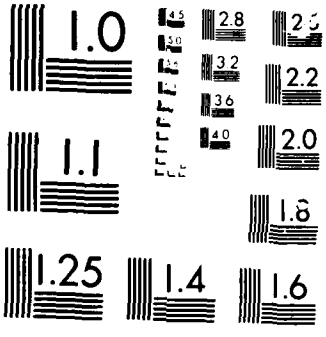
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NAVAL POSTGRADUATE SCHOOL
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A PROPOSAL FOR A COMPUTER-BASED INFORMATION SYSTEM TO SUPPORT THE PORTUGUESE AIR FORCE WAR COLLEGE (IAEFA)

by

João Alberto Mendes Mascarenhas

March 1986

Thesis Advisor: M. P. Spencer

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A Proposal for a Computer-Based Information System To Support the Portuguese Air Force War College (IAEFA)

by

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Submitted in partial fulfillment of the requirements for the degree of

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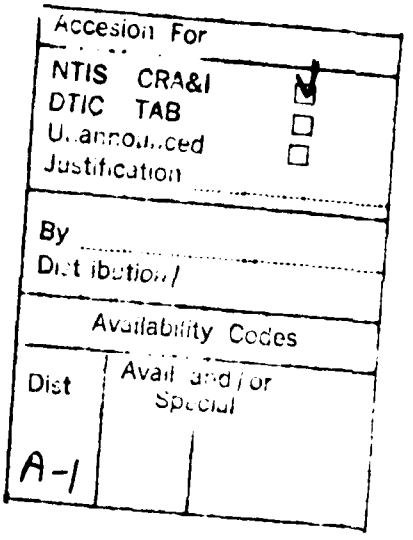
ABSTRACT

This thesis applies IBM's Business Systems Planning (BSP) methodology to the design of an information system architecture for the Portuguese Air Force War College (IAEFA).

The current manual system is described identifying each organizational group and the functions each perform. The BSP methodology is also defined including its background, underlying concepts and potential benefits. The BSP methodology is applied to the Portuguese Air Force War College (IAEFA) resulting in a list of data classes, a process/data class matrix and an information flow diagram.



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I. INTRODUCTION

A. PURPOSE OF THESIS

The purpose of this thesis is to establish an informati.a system plan using IBM's Business Systems Planning (BSP) methodology for the Portuguese Air Force War College (IAEFA).

B. MOTIVATION FOR THE STUDY

The Portuguese Air Force War College (IAEFA) plays a vital role in fulfilling the mission of the Portuguese Air Force. To attain the national purpose and to achieve the nation's objectives, the Air Force must maintain a corps of officers, airmen, whose dedication to the nation's defense places duty, honor and country above self. They must have an in-depth knowledge of war and the military sciences to meet the challenges in today's world. The IAEFA contributes to the development of this knowledge through its professional education programs, research and doctrinal studies.

The IAEFA management information system is fundamentally a manual system and the present I/S strategy does not meet the needs of the different levels of management.

The premise for conducting a BSP study is that there exists within the IAEFA organization a need for significantly improved computer-based information systems and a need for an overall strategy to attain them. BSP is concerned with how these information systems should be structured, integrated and implemented over the long term.

C. SCOPE

The study includes the entire IAEFA organization which is made up of three main areas, the Directorate, the Academic Department and the Support Department. No area of the organization will be exempt, therefore allowing for an integrated plan for the entire organization.

II. CURRENT SYSTEM DESCRIPTION

A. MISSION AND LOCATION IN CHAIN OF COMMAND

1. Mission

The Portuguese Air Force War College (IAEFA) has, as essential mission:

a. To provide knowledge related to the preparation and orientation of war and other obligations, necessary in the performance of the duties of a general flag officer of the Air Force.

b. To prepare officers for the performance of duties as senior officers, namely in the command of Air Force bases, in the services Directorates and in the General Staff (Air Force).

c. Accomplishment of courses in order to develop the culture of the officers in the domains of military principles and technical knowledge linked with the social conditioning where the military institutions are integrated.

d. To colaborate with the General Air Force Staff in studies of organization, regulation and doctrinal principles [Ref. 1:p. 2-1].

2. Location in Chain of Command

The Portuguese Air Force War College (IAEFA) reports directly, through its Director, to the Chief of Staff Portuguese Air Force [Ref. 1:p. 2-1].

B. ORGANIZATIONAL STRUCTURE

1. General Schema

The Portugugese Air Force War College (IAEFA) has three fundamental areas: Directorate, Academic Department and Support Department [Ref. 1:p. 3-1].

The Directorate is formed by a Director, a Deputy and two Assistants, and is attended by a Scholar Council.

The Academic Department includes: Academic Department Head, th Faculty, the Senior Course of Air Warfare (CSGA), the General Course of Air Warfare (CGGA), short courses and commissions for studies work determined by the Chief of Staff of Portuguese Air Force.

The Support Department includes: Support department head, secretaryship, translators offices, a support academic section and a logistic support section.

The organizational structure of the Portuguese Air Force War College (IAEFA) now defined is schematized in Figure 2.1 (The IAEFA Organization Chart) [Ref. 1:p. 8-1]

2. The Directorate and the Scholar Council

The Directorate is formed by a director, a deputy and two main assistants, and attended by a Scholar Council.

a. Director

> The director of the IAEFA is an Air Force Lieutenant General, named by the Chief of Staff of Air Force (CEMFA) and has the following duties: He supervises all the activities of the College; he proposes the CEMFA the nomination of the deputy, the director of the CGGA and other staff and faculty; he proposes to the CEMFA for approval the study plans; he supervises through the respective directors, the courses that take place in the College; he controls the execution of the approved programs and he attends, whenever convenient, the school works, in order to coordinate the teaching and pedagogic action developed by the faculty; he promotes the scholar council meetings and assumes their presidence; he proposes the necessary budgets and supervises their administration.

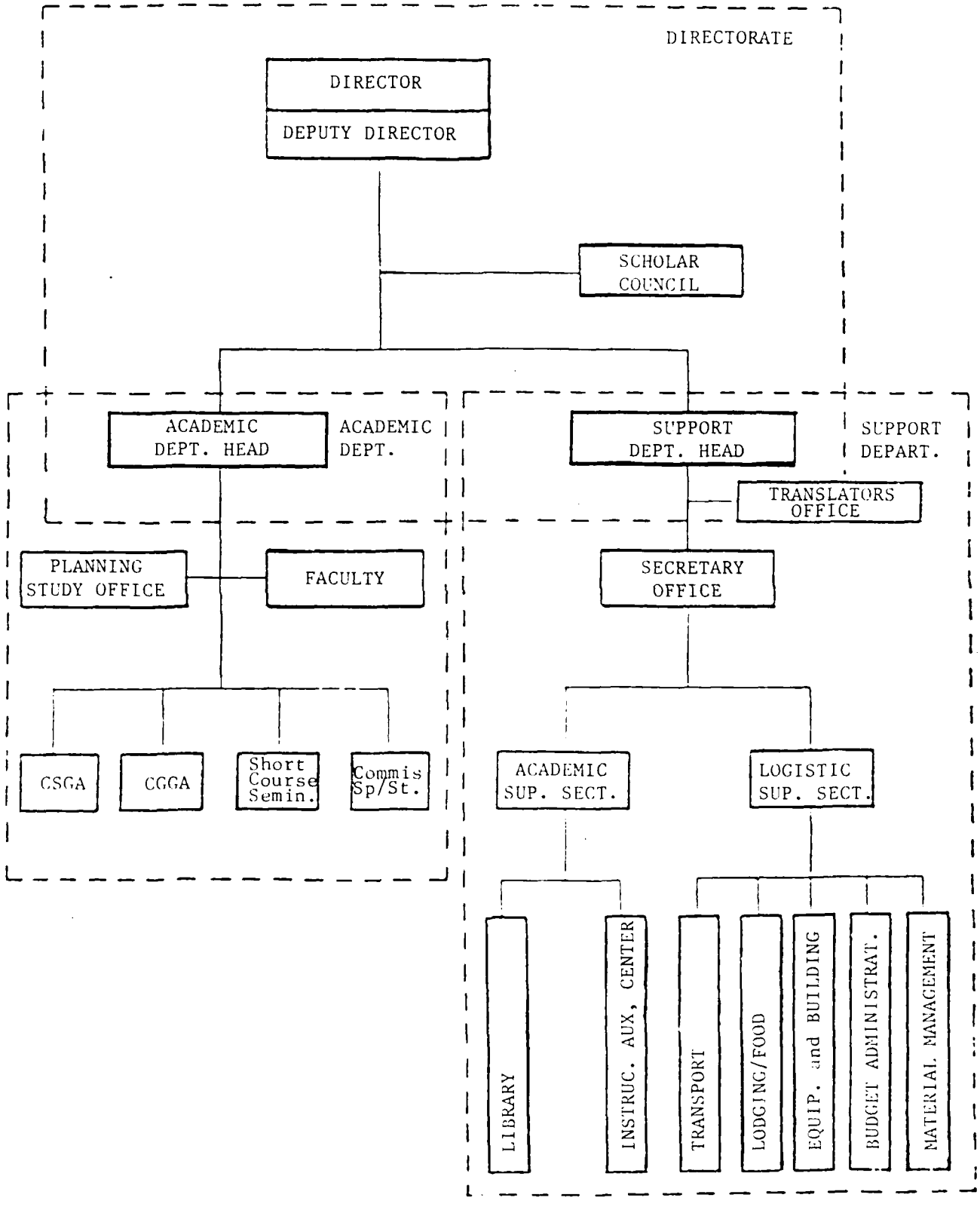

Figure 2.1 The IAEFA Organization Chart [Ref. 1:p. B-1]

b. Deputy Director

The deputy director of the IAEFA is a Major General of the Air Force, named by the CEMFA and has the following duties: he helps the director of the IAEFA in all his functions and replaces him whenever he needs, also having the charge of directing the academic department and the CSGA.

c. Scholar Council

The Scholar Council is the organ of consulting and studying of the Directorate of the IAEFA in pedagogic and doctrinal subjects.

(1) Constitution: The Scholar Council is convocated and presided only by the Director of the IAEFA or when he is absent, by the Deputy Director and is composed of:

* The Director of the IAEFA, who presides.
* The Deputy Director of the IAEFA in this function and as director of the CSGA.
* The Director of the CGGA.
* The assessors of the CSGA.
* The Faculty of the CGGA.

(2) Function and duties: The Scholar Council has the following duties:

* To give advice about teaching philosophy and doctrine.
* To discuss the making of the courses planning.
* To program the teaching.
* To give advice about the themes of the individual or collective research work of the students.
* To analyse the subjects put to their deliberation namely that which is concerned with the students' academic results and their attendance in courses, as well as proposals for the nomination of military and civilian professors and instructors.

The Scholar Council may have a variable composition, according to the subjects to be worked out. The agenda of the meetings, as well as the date of the convocation and the specific constitution of the group, will be decided by the Director of the IAEFA in the act of their convocation. To the meetings of the Scholar Council, they may attend when asked, representing the respective courses, the leaders of the courses and another officer designed for this effect, by the students. Other

officers of the College may also be invited whenever their presence and intervention in the sessions is considered necessary.

3. Academic Department

The Academic Department, the fundamental area of the College for the accomplishment of its mission is constituted by: Academic department head, Faculty, Planning Study Office, Senior Course of Air Warfare (CSGA) and General Course of Air Warfare (CGGA); Short Courses or Seminars and Commissions for Specific Studies.

a. Academic Department Head

The academic department is led by the Deputy Director, who is in charge of every pedagogic action and doctrinal subject. Moreover, the leader of the academic department who combines these functions with the ones of the deputy director and of the Director of the CSGA, has in what concerns this sector, the following general duties:

(1) To conduct and coordinate all the pedagogic and doctrinal activities of the IAEFA.

(2) To coordinate the activity of the Faculty, in order to get the best results for the satisfaction of the needs of the several courses.

(3) To coordinate and evaluate the means at his disposition.

b. Faculty

The Faculty is formed by all the assessors and military and civilian professors and instructors, permanent or temporary, who serve in the IAEFA, namely: The Director of the CSGA; the Director of the CGGA; the Assessors of the CSGA; the Professors and Instructors of the CGGA and Professors and Instructors of the temporary short courses or seminars.

(1) Directors of the Courses

The Director of the CSGA is the Deputy director of the IAEFA. The Director of the CGGA is a pilot

Colonel named by the director. The directors of Short Courses or Seminars are named by the director who chooses among the members of the faculty, according to their availability and the characteristics of the course or seminar.

(2) Assessors of the CSGA

The assessors of the CSGA (a maximum of three), perform similar functions to the professors and they have the rank of Major General or Colonel of the Air Force. They are named by order of the Chief of Staff of Portuguese Air Force, by proposal of the director of the IAEFA. The assessors of the CSGA must:

* Cooperate with the director of the course, in programing and coordinating the several areas of study;
* Keep the normal function of the study areas delegated;
* Colaborate in the seminars and research work of the auditor officers;
* Colaborate with the work of the Scholar Council and of the CSGA Council;
* Perform other jobs determined by the director of the College, related to the activities of the IAEFA, namely in other courses or seminars.

(3) Professors and Instructors of the CGGA

The professors and instructors of the General Course of Air Warfare (CGGA) may be:

* Permanent Professors to a Maximum of 10, named by the Chief of Staff of the Portuguese Air Force (CEMFA) by proposal of the director of the IAEFA.
* Permanent adjuncts, to a maximum of 4, named by order of the CEMFA by proposals of the director of the IAEFA, when special teaching needs justifies it.
* Temporary instructors, named by order of the CEMFA, by proposals of the director of the IAEFA, also when special teaching needs justify it.
* Civilians, individuals of recognized competence to teach subjects which nature demands are contracted by the General Staff (Air Force) by nomination of the director of the IAEFA.

They have the following duties:

* To teach the lessons and to give conferences;
* When they are leaders of study areas, they must keep the normal function and coordination of the activities;
* To collaborate with the work of the Scholar Council and of the CGGA Council;
* To collaborate in the seminars and resource work of the officers who attend the course;
* To collaborate with the director of the course, in the programing and coordination of the several study areas;
* To elaborate or collect manuals and texts and actualize the ones already in existence;
* To examine the periodic publications in order to actualize or maintain the files in the library;
* To perform other jobs determined by the director of the College, related with the activities of the IAEFA, namely in other courses or seminars;

(4) Assessors, Professors of the Short Courses or Seminars

The assessors and professors of the short courses or seminars are named by the director of the IAEFA among the assessors, professors and instructors of CSGA and CGGA. They have the following duties:

* To cooperate with the director of the course or seminar in the making of the planning and in the programing and coordination of the several activities foreseen;
* To keep the normal running of the areas of activity delegated to them;
* To collaborate in the seminars and research work of the officers who attend the course;
* To collect texts and bibliographies.

c. Planning Study Office

This is the support organ of the Academic Department Head. This office must:

(1) Schedule the school classes.

(2) Coordinate the using of instruction auxiliars and schedule the classrooms.

(3) Explain study planning, programs, regulations and other basic documents to orient new faculty.

(4) Keep a file of the curricula for military and civilian people, who may have interest in the faculty activities.

(5) Publish internal orders about the beginning and the end of school activities.

(6) Distribute summaries of academic activity, for historical and statistical purposes.

(7) File all the documentation concerning the academic activity, namely information about school results, classifications, amplified judgements etc.

d. Temporary Commissions for Specific Studies

These commissions have the result of performing studies of the organization, the regulations and the principle doctrinal jobs in collaboration with the Air Force General Staff, or by its order.

These commissions are constituted by professors and assessors of the College named by the director and working under his direct orientation, although for effects of coordination of activity they depend from the leader of the Academic Department.

4. Support Department

The Support Department's function is to provide the administrative and logistic support of the pedagogic activities of the IAEFA; the administration of its private staff; the coordination of the support to be given from the command of the Air Force Base Number 1 (BA1), according to the rules established in specific protocol.

In what concerns structure, this department includes: The department head, secretaryship, translator's office, academic support section and logistic support section.

a. Department Head

The support department is led by a senior officer who has the function of assistant of the IAEFA Director. By history and custom, he is the military security officer of the College.

He has the following duties:

(1) He conducts and coordinates the tasks of the sections and their dependent services, in order to get the best results from the support branch.

(2) He administers the private staff of the IAEFA, according to the established rules, in the protocol IAEFA/BA1.

(3) He executes the tasks of protocol and public relations as determined by the Director of the IAEFA.

(4) He follows up on the orders coming from the Director.

(5) Monthly, he gets from the Financial Services of the BA1, the availability of the budget for the IAEFA and he presents it to the Director after comparing it with the expenses already incurred and registers it in his own department.

(6) He proposes within a reasonable time and in co-ordination with the Financial Services of the BA1, the reinforcement of the necessary budget for the normal running of the College.

(7) He asks the BA1 for provision of: transports, check outs and repairs of installations and equipment, the lodging and food or other necessary services to the IAEFA, fully respecting the rules established in the protocol IAEFA/BA1.

(8) He receives, judges and does what is correct and necessary with the requests, comments and claims from the staff of the IAEFA, concerning the support service.

(9) He writes and distributes all the rules related to the military security, namely the ones coming from the BA1.

b. Secretaryship

The secretaryship is led by a captain or a commissioned junior officer and must:

(1) Supervise the work of the internal service orders of the IAEFA, reviewing and preparing the subjects for publication.

(2) Supervise the processing of all correspondence of the College and filing.

(3) Expose, share and circulate the communications and orders, according to the rules.

(4) Inform the command about the requests for leave and registers all the leaves and releases.

(5) Open and close the main gates of the IAEFA buildings everyday, according to the established time.

(6) Manage resources such that the installations are in an impecable condition of cleanliness and order.

(7) Keep on the key racks, the keys of all the dependences which are not being used, being sure that the main key of the College is delivered to the officer on duty at the BAI.

(8) Proceed with regular provisions of military justice if a specific dispatch doesn't take out such a responsibility.

(9) Do, in the first month of each year, the chart "Planning of vacancies" including all staff of the IAEFA.

c. Translator's Office

The translator's office makes the translations requested by the Directorate, Faculty and Library, through the leader of the section and in the support department, also assuring the revision of their texts.

d. Academic Support Section

The Academic Support Section joins all the means of technical support, indispensible to the scholar activity. It is led by a Major or a Captain. This section includes the Library and the Instruction Auxiliary Center. The Library is led by a librarian helped by an archivist. He must:

(1) Receive, classify and keep all the publications bought by or offered to the College and the ones published by the academic department in the graphic services section, in order that at least two copies of each publication made by IAEFA are delivered to the Library. Moreover, from the research works of the students, three copies are to be delivered in the Library, only one of them being to its charge. After one year, the other two copies are retired and delivered to the Instruction Auxiliary Center.

(2) Catalog the new books.

(3) Search, in collaboration with the Faculty, all the publications received, in order to keep current the file by subjects.

(4) Keep current all the remaining files, necessary for the ready access of books and magazines.

(5) Control the magazines or other periodic publications in order to receive them.

(6) Do an informative note, weekly, about the books and magazines received, which will be distributed by the faculty and students.

(7) Keep the library open, during the established time, watching the proper use of the books.

(8) Keep the library in an adequate condition of cleanliness and order.

(9) Control the existing material through a prop[illegible] register book and use of the NATO publications (or others) that contain classified subjects of didatic and informative character, according to the respective security classification.

The Instruction Auxiliary Center works as an extension of the Graphic Services Section of the BAI. It is destined to file and control the production and distribution of publications and to ensure the works of the services of sound, photography, projection, cinema and television. It is led by a captain or a commissioned junior officer helped by a sargeant and must:

(1) Give the faculty of the College the instruction auxiliars, the publications they need for classes or other academic activities.

(2) Verify the execution of all typing, design and reproduction of documentation, necessary for the courses and seminars.

(3) Verify that all the documents produced in this section, adhere to the established rules in the regulations manuals giving or asking for each publication, the appropriate order number.

(4) Verify the delivery, in the instruction auxiliary section, of all publications produced by the graphic services of BA1.

(5) Plan in advance, the production of publications giving them priorities to satisfy the needs throughout the school year, in order to ease the graphic services of the BA1.

(6) Ensure the stocking and filling didatic/informative material, made and issued in the graphic services section of the IAEFA.

(7) Tag and file instruction auxiliars, publications and other necessary documents to teach.

(8) Organize and keep actualized a file and an "index of the publications of the IAEFA" in stock, sending them to the entities of their list of distribution through the right channel.

(9) Deliver in the library, two samples of each of the new publications issued in the College.

(10) Introduce the necessary corrections for actualizing the publications in stock.

(11) Deliver to the library the documents of request from external people to the IAEFA, after approval of the director in what concerns this supply.

(12) Keep the installations of the section clean and in order.

(13) Keep current the inventory of the material of the rooms used by the section.

(14) Ensure the operational condition of the equipment of the section (projectors, recorders and accessories) taking care of their operation and repairs.

(15) Keep a register, classified by basic subjects where one can find all the elements of identification in what concerns the support in the section, such as transparencies, diagrams, letters, films.

(16) Propose acquisition of all instruction auxiliary material needed according to requests from the faculty and student officers.

e. Logistic Support Section

The logistic support section must act, coordinate and verify all logistic support, indispensible to the IAEFA, either if this is processed by the Portuguese Air Force War College (IAEFA) or if it is supplied by the Air Force Base number 1 (BA1).

In what concerns the support given by the Air Force Base number 1 (BA1), it is part of a protocol between the Portuguese Air Force War College and the Portuguese Air Force Base number 1. The existence of this protocol of support from the BA1, is justified because the IAEFA is placed within the BA1 and it doesn't have by itself enough logistic means.

The logistic support section of the IAEFA, led by a captain or commissioned junior officer has supplies in what concerns transports, lodging, food, equipment, furniture, facilities including buildings and budget administration. As for transports the section head requests all the necessary items, determined by the chief of the support department. For lodging and food he must ensure the accomplishment of what is inserted in a protocol established between the IAEFA/BA1, in order that all the IAEFA staff have adequate food and lodging in the Air Force Base number 1 messes.

(1) Request the Commander of BA1 for the preventive inspections and necessary repairs in the buildings, their equipment and furniture.

(2) Make and keep current the charge of goods and equipment, noticing that charge in each division.

(3) Ensure that all furniture and equipment are in good order.

In what concerns the administration of budgets he must:

(1) Get monthly, from the Financial Services of the BA1 the budgets for the IAEFA, presenting them to the

director, after comparing them with the expenses already made and registered in its own section.

(2) Control all the expenses, namely the ones related with the acquisition of books, goods, etc., in order to always be able to inform their seniors about the availability of budgets.

(3) Propose in useful time and in coordination with the financial services of the BA1, the reinforcement of necessary budgets for the normal and full running of the College.

(4) In contact with the Planning Study Office, foresee the expenses for each course and statistic summaries of the real expenses.

C. COURSES AND SEMINARS

In the IAEFA, there are now, three types of courses: Senior Course of Air Warfare (CSGA), General Course of Air Warfare (CGGA), temporary Short Courses and Seminars [Ref. 1: p. 4-1]

1. Senior Course of Air Warfare (CSGA)

a. Finality

The attendance at CSGA is a special condition for promotion to the rank of General Officer. It is to complement the preparation for the performance of the High Command and Direction jobs, within the general concept of doctrinal unity and intelectual flexibility for the preparation, support and execution of the military actions within their several modalities and for the proper administration of the military systems.

b. Duration

The duration of the CSGA is usually a school year.

c. Characteristics

The CSGA has fundamentally an informative character, not only because along their careers the auditor officers were successively and duly evaluated and consequently, rigorously selected, but also because the course wishes to provide a time of deep reflection without the usual conditionalisms, in a sincere open environment about the problems put to the highest command and leadership scales.

d. Organization

The CSGA is organized in study areas, each one about the primary responsibility of an assessor and coordinated by the director of the course. The names of the areas, the subjects and the description of these subjects will be inserted in the study planning approved by the CEMFA for each school year.

e. Attendance

The CSGA is attended by Senior Officers, usually Colonels, named by the CEMFA. It may be also attended by Army and Navy Officers or by Foreign Armed Forces Officers, by permission of the Chief of Staff of Portuguese Air Force.

f. Scholar Evaluation

The evaluation of the student officers of the CSGA is made along the course, after the interest and participation showed, and it will mean, at the end of the course, a short nominal report, that will be sent to the Vice-Chief of Staff of the Portuguese Air Force.

g. Disenrollment

Officers can be disenrolled of attendance of the the CSGA, who:

(1) Miss more than one fifth of the useful days of school work.

(2) For disciplinary reasons, are sent to the CEMFA, by the director of the College.

h. Course Council

Within the course area and whenever necessary, the course council can meet, convocated and presided by its director, for consulting and studying of pedagogic matters.

2. General Course of Air Warfare (CGGA)

a. Finality

The General Course of Air Warfare (CGGA) is special condition for promotion to Major Rank Officer and within the general teaching finality in the courses of the IAEFA, already referred; it is specially destined for the preparation of Command function, Directorate, Leadership and Staff Officer, inherent to the ranks of Senior Officers. This course is by itself, habilitation enough for the performance of staff officer functions in the Portuguese Air Force and in the Armed Forces Joint Commands.

b. Duration

The duration of the CGGA is usually one school year.

c. Characteristics

The CGGA, being special condition for promotion to Major Rank Officer, assumes, naturally, in this phase of all

the officer's career, the aspect of selective course. So, it it indispensible the evaluation of the student officers' results.

d. Organization

The CGGA is organized in study areas, each one under the responsibility of a professor and coordinated by the director of the course. The names of the areas, the subjects and their description will be inserted in a study plan to be approved by the CEMFA for each school year.

e. Attendance

The CGGA is attended by Officers, usually captains, named by the CEMFA. It can also be attended by Army or Navy Officers or by Foreign Armed Forces Officers, by permission of the CEMFA.

f. Disenrollments

Students are usually disenrolled when they:

(1) Miss more than one fifth of the useful days of school work.

(2) By disciplinary reasons, are sent to the CEMFA by the director of the College.

(3) Are proposed by the academic council, before the end of the course, for being special cases, for poor results and/or capacity.

g. Academic Evaluation

The academic evaluation is made by:

(1) In special cases of poor results, in a proposal of disenrollment at any time of the course.

(2) In the final classification, by "Pass" or "Fail".

(3) In the amplified judgement for each student.

h. Means of Evaluation

Usually, the elements of evaluation are:

(1) Formal evaluation - It assumes the written form. It is not totally addressed to the memory, nor it will have repetitive character. On the other hand, the formal evaluations will put questions to answer by interpretation or by integrated application of the knowledge attemption to be evaluated.

(2) Individual Research Work - It is the study of problems with written and/or oral presentation of the results or conclusions. They may face only the application of subjects in one or more study areas, or the research and integration of other elements. In one and other cases, the student officer can consult the necessary and possible documents and people.

The execution of a research work accepted, is a necessary condition for success in the General Course of Air Warfare (CGGA).

(3) Group Works

The president, with all the members, schematizes the work, attributes the research elements and the task of each part for each member and coordinates the individual tasks in order that the global product is homogeneous. If there is an oral presentation of work, each member will tell the part he made. The answers to the questions will be given in the same way.

(4) Seminars

The participation in Seminars will be evaluated by the professor present, being specially attentive to the following aspects: individual preparation for the theme, contribution of the interventions for the success of the Seminar and performance of the functions attributed in the Seminar.

(5) General Academic Activities

The participation in the academic activities in general, involves the interventions in classes and conferences and everything that may contribute for the work of the amplified judgements about the students. Since the marks to give to the students are individual, the elements to be chosen will be of individual marks,

although they count with the whole aspects of the classification.

i. Expression of Evaluation

The results of the evaluation will be expressed in five levels:

Level 1	-	from	0	to	6	points
Level 2	-	from	6.1	to	9.9	points
Level 3	-	from	10	to	13	points
Level 4	-	from	13.1	to	16	points
Level 5	-	from	16.1	to	20	points

As a rule, the academic council will integrate the elements for classification of the students in four occasions, with the following provisions:

The first, after one third of the course, as soon as there is an effective and sure appreciation of the students. After this appreciation, all the student officers considered by the council as inserted in levels 1 and 2, will be informed.

The second, after two thirds of the programmed time for the course. For this appreciation, the following criteria are used: all the student officers will be considered with academic results, if they have average marks superior to level 2. From this appreciation, they will result the proposals of disenrollment of students about whom there are no doubts in what concerns the impossibility of success and an advice to other students whose results are becoming worse.

The third, in the end of the course, before the oral presentations. The classifications got in the study areas as well as the written work of the research will be appreciated. From this appreciation, it can result: attribution of the classification of "without result" if in the teaching areas his results are not according with the established; admission to the oral presentation of the research work; determination of elaboration of new research work if the written part of the research work has been classified negatively.

The fourth and last one, after the oral presentation of the research work, from which it can result: final classification of "with result"; determination of the elaboration of new research work, if in the oral presentation there isn't success.

The repetition of the research work is considered an exception procedure. From the presentation of the second research work, first the written part and then the oral presentation, it can result: classification of "with result" if accepted for oral presentation and accepted in it; classification of "without result" if refused in the written form or oral presentation. In cases of proposal of elimination superiorly approved or after attribution of the final classification, for each officer there will be a file of appreciation established that includes an amplified judgement.

3. Temporary Short Courses and Seminars

a. Purpose

Temporary short courses and seminars must amplify the officer's culture in the domains of military doctrine and technology and in the knowledge concerned with the social conditioning that integrates the military institutions. Moreover, they can be planned to fill faults in the general preparation or to get and dominate new administration technologies, or the use of military forces or as intermediate courses to soften the inconveniences of long period breaks among the programmed courses.

b. Organization

The organization, conditions of attendance and results of each short course or seminar will be defined according to the specific conditions that justify it, and they will be included in its plan, made by the director and presented to the CEMFA for approval.

III. PRESENTATION OF BUSINESS SYSTEMS PLANNING

A. THE BACKGROUND OF BUSINESS SYSTEMS PLANNING (BSP)

The BSP was developed by IBM and is a structured approach to assist a business or an organization in establishing an information systems plan to satisfy its near- and long-term information needs.

"Experience has shown that BSP can be applied to all institutions in the public sector and all industries in the private sector, because the requirements for developing information systems are similar regardless of the business served or the products and services provided." [Ref. 2: Preface]

Although the function of one organization may be different from another, their objectives are the same in what concerns to maximize the use of available resources while minimizing the costs to obtain them. Almost the totality of the information provided in this chapter has been extracted from [Ref. 2].

Getting knowledge from its own mistakes and those of other companies that attempted to implement large information systems in the the 1960's, IBM realized that a disciplined approach was required, using proven principles and methodologies. In the year of 1966 a businesswide Information Systems Control and Planning Department was established at IBM's Data Processing Group headquarters. The Data Processing

Group was a total organization unit comprising the engineering, manufacturing, marketing and service divisions responsible for all of IBM's domestic data processing business.

Until the control and planning department was established, IBM had little overall direction in the internal use of Computers. In fact, little coordination took place between divisions; most data processing activities were confined to locations and units within divisions. Consequently, each manufacturing plant and marketing region developed and operated its own system. Although the individual systems carried out similar functions, they differed in design and performance; they could not be used interchangeably and could not communicate with each other, so the systems were mainly satisfying local department needs, rather than doing an overall data processing job.

When some steps were taken to improve the data processing system within a division, little attention was given to an effective interface of that system with input from engineering and output to manufacturing. In this way, the business was not getting the return on investment from data processing that it could have because the information needs of the organization and particularly those of the general manager responsible for the organization, were not being accommodated.

The first effort of the control and planning department was to inventory and profile the systems existing within the organization and the plans for the future. At the same time,

recognizing that the data processing effort must be directed toward satisfying organizational needs and not solely toward individual functions and departments, the control and planning department established a set of information system strategies covering five major areas [Ref. 2:p. 2]:

1. Fixed data responsibility
2. Single source and parallel distribution of data
3. Central control and planning of information systems
4. Organizational independence of data
5. Resource sharing of data, equipment and communications.

Knowing what was being done with data processing, and the direction established through the set of strategies, the department defined an integrated set of information systems and assigned responsibilities for the development of the systems. These systems addressed the operational, functional and general management needs for information.

As the definition and design efforts for this organization-wide set of information systems got under way in the late 1960's, many of IBM's customers showed interest in learning how they might better manage their information system resources. In an effort to assist these interested customers, IBM established the Business System Planning (BSP program in 1970).

To carry on the program, the nucleus of the control and planning department that developed the internal information systems plan was moved to the Data Processing Division headquarters. This group proceeded to document proven methodologies and instituted a training program to educate regional and branch office personnel and customers in the approach.

As gaining the commitment is the keystone to a BSP study, executive briefing and seminars were established to show customer executives the potential benefits of the approach and the reasons why their involvement was vital to successful implementation of information systems.

The methods utilized in developing this information systems plan and the lessons learned have since been used by many IBM customers. Studies using the BSP methodology and guidelines have been conducted successfully by profit and nonprofit organizations of varying size [Ref. 2:pp. 2-3].

B. OBJECTIVES AND POTENTIAL BENEFITS OF BSP

1. Objectives

The most important objective of BSP is to provide an information systems plan that supports the organizational short- and long-term information needs and is integral with the Organization plan. There are several objectives that help to justify and clarify this approach:

a. Provide a formal, objective method for management to establish information systems priorities without regard to provincial interests.

b. Provide for the development of systems that have a long life, protecting the systems investment, because these systems are based upon the organization processes that are generally unaffected by organizational changes.

c. Provide that the data processing resources are managed for the most efficient and effective support of the organization goals.

d. Increase executive confidence that high-return, major information systems will be produced.

e. Improve relationships between the information systems department and users by providing for systems that are responsive to user requirements and priorities.

f. Identify data as a corporate resource that should be planned, managed and controlled in order to be used effectively by everyone [Ref. 2: p. 3.].

2. Potential Benefits

The application of the Business Systems Planning approach and methodology offers many potential benefits to three management groups:

a. To Executive Management

(1) An evaluation of the effectiveness of current information systems.

(2) A defined, logical approach to aid in solving management control problems from an organization perspective.

(3) An assessment of future information system needs based on organization-related impacts and priorities.

(4) A planned approach that will allow an early return on the organizational information systems investment.

(5) Information systems that are relatively independent of organization structure.

(6) Confidence that information system direction and adequate management attention exist to implement the proposed systems [Ref. 2:p. 3].

b. To Functional and Operational Management

(1) A defined, logical approach to aid in solving management control and operational control problems.

(2) Consistent data to be used and shared by all users.

(3) Top management involvement to establish organizational objectives and direction, as well as agreed on system priorities.

(4) A system that is management and user oriented rather than data processing oriented [Ref. 2:p. 4].

c. To Information System Management

(1) Top management communication and awareness

(2) A better long-range planning base for data processing resources and funding.

(3) Personnel better trained and more experienced in planning data processing to respond to business needs.

(4) User involvement in information systems priority setting [Ref. 2:p. 4].

C. BUSINESS SYSTEMS PLANNING CONCEPTS

1. Support the Goals and Objectives of the Organization

This is the most basic concept which underlies the "top down" philosophy of the methodology as well as several of the specific steps, such as executive interviews and system priorites.

Since information systems can be an integral part of an organization and be critical to its overall effectiveness, and because they will continue to represent major investments of time and money, it is essential that they support the Organization's true needs and directly influence its objectives.

In this way, it is important that an organization be willing and able to express its long-term goals and objectives. For some organizations, this can be done mainly through the organization plan. For others, where an organization plan is not available or current, it can be done as a part of the BSP methodology. In either event, a recognition of this basic need by senior management is very necessary, for only with

that recognition will their commitment and involvement be great enough to guarantee a meaningful BSP study [Ref. 2:p. 5].

2. Address the Needs of All Levels of Management

There are several implications relative to I/S structure which are here required. First, it is important to recognize the varying characteristics of information as needed by different activities and management levels.

Usually, lower levels need considerable detail, volume and frequency, higher levels need summaries, "exception" reporting and inquiries and still higher levels need cross-functional summaries, special requests, "what if" analyses and "external" requirements.

It would not be practical to construct a single system to accommodate all activities or management levels, and it would not be correct to associate any one type of information requirement solely with one management level. Evidently, there is need to establish some reasonable structure upon which the Information System can be defined.

The emphasis in Information System should be in support of management decision making. Organizational decisions are made for various purposes, but most can be associated with either planning or control.

Planning, of course, is the establishment of various missions, objectives and policies, and it occurs at all levels; good information is essential to the establishment of good plans. Control decisions, by contrast, are made in order to

guide an activity toward some implicit or defined objective. The Information System can provide the measurements of the current or actual condition to the decision maker. Since planning and control are the keys to decision making, a framework for information system based upon these activities can be used. It has been proposed and well accepted today, that three distinct but concurrent planning and control levels exist in any organization: Strategic Planning, Management Control, Operational Control and an Information System could conveniently address itself to any one of the three planning and control levels [Ref. 2:p. 6].

3. Provide Consistency of Information

Consistency is the keyword in this objective. Traditional data processing applications is not necessarily consistent, particularly when applied to new business problems (decision areas) of broader scope. As a result of a historical evolution of computer usage the problems in data consistency normally arise. Isolated and independent application areas are selected and mechanized, usually to reduce operational costs. The data files are defined as necessary to support the specific needs of each application without regard to one another or to future applications. The data itself is converted from manual files located and maintained by the using organization.

As computer applications are added, new data files are normally required since the data requirements for different

applications are not generally the same. These are usually created from spinoffs of existing mechanized files plus any additional data that may be required from the using area. Data then, exists in most organizations in varying form, definition and time. All of these factors can make data become inconsistent. This becomes a problem most often during interdepartmental decision making or at higher reporting levels where consolidation of multifunction activities is important.

In order to start to address the data consistency problem, a different philosophy must be adopted relative to data management. This is commonly referred to as managing data as a resource. This concept suggests that data is of considerable overall value to an organization and should be managed accordingly. It should be potentially available to and shared by the total business unit on a consistent basis. It should not be controlled by a limited organizational segment but by a Central Coordinator. The management function would include formulating policies and procedures for consistent definition, technical implementation and security of the data [Ref. 2:p. 7].

4. Survive Organizational and Management Change

To provide the information needs of a specific department or other organizational entity, many data processing systems and applications are set up. Others are built only on the specific output report requirements of a particular manager. Both types can become immediately obsolete upon a

reorganization or management change. A new manager may have his own ideas as to what information is needed to run the department. Although this kind of change is inevitable, it can be expensive from a data processing standpoint. The data processing system, however, should in no way inhibit management flexibility in a dynamic enterprise. In fact, the information system must be able to evolve through the long term organizational and management changes of a business with minimum impact if the expected return on investment is to be realized [Ref. 2: p. 8].

5. Implement Project-By-Project to Support the Total Information Architecture

With this concept there are several implications associated. The first, is that a total information system to support the entire organization unit's needs is too big to build in any single project. However, because of the many problems associated with a "bottom up" evolution of systems (such as data inconsistencies, non integrated system designs, expensive resystematizing, priority difficulties), it is very important that long-range goals and objectives for information systems (I/S) be established. The basic concept, then, is "top-down I/S planning with bottom-up implementation." (See Figure 3.1)

With this implementation strategy (The BSP approach), the information support is implemented in a modular building-block fashion over time, while remaining consistent with the organization's priorities, available funds and other

shorter-term considerations. This philosophy can be likened to the detail design and construction of a large office building, which would be unthinkable without an architect's approved drawing of the finished product [Ref. 2:p. 8].

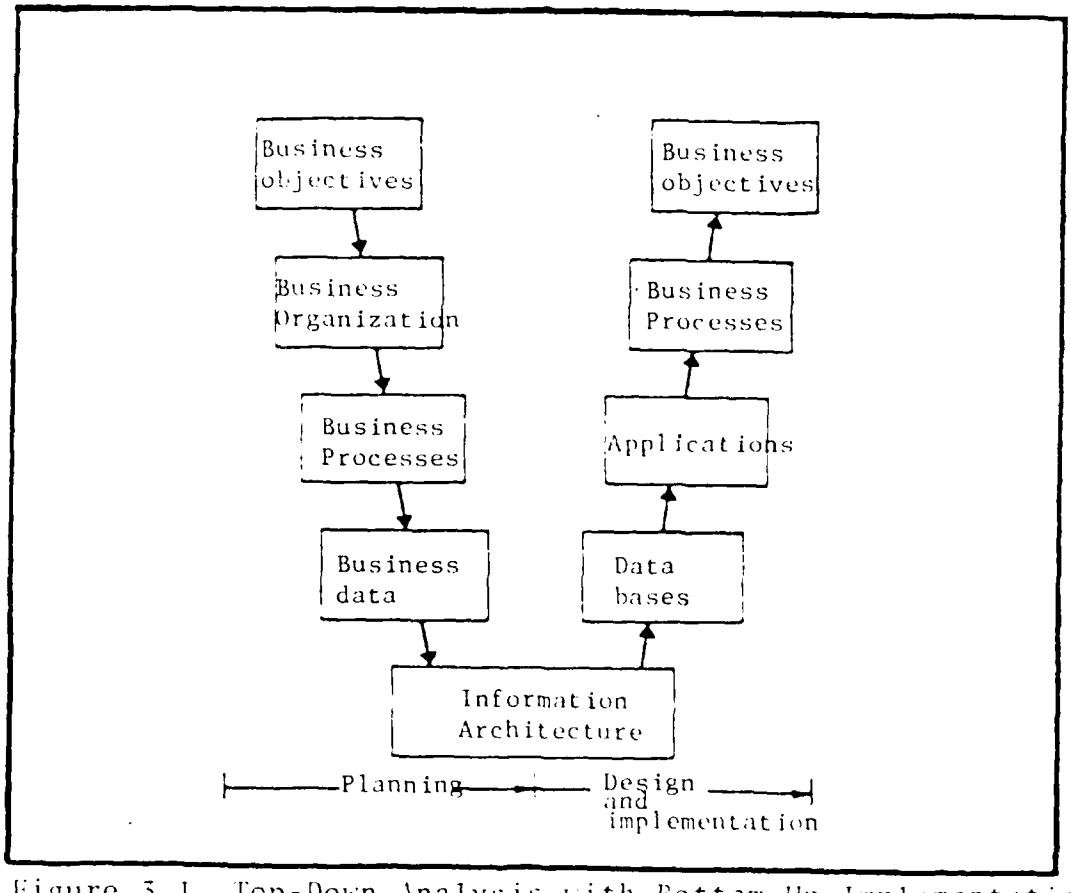

Figure 3.1 Top-Down Analysis with Bottom-Up Implementation [Ref. 2:p. 9]

IV. DEFINITION OF PORTUGUESE AIR FORCE WAR COLLEGE (IAEFA) PROCESSES

A. THE REASON FOR DEFINING THE PROCESSES

The IAEFA processes are defined as groups of logically related decisions and activities required to manage IAEFA resources. Defining the IAEFA processes is one step in the BSP methodology and the reason for defining the processes is that doing so will provide or lead to:

1. An information system that is largely independent of organization changes.
2. An understanding of how the Portuguese Air Force War College accomplishes its overall missions and objectives.
3. A basis for defining required information architecture, determining its scope, making it modular, and setting priorities for its development.
4. A basis for defining key data requirements [Ref. 2:p. 29].

B. BASIC STEPS IN DEFINING PROCESSES

In defining business process, we seek to identify the major organizational activities and the personnel involved. In this way, the basic steps in defining processes are to: Identify processes, write description of each process and relate the processes to organization. An overview of the basic steps in defining processes is provided by Figure 4.1 [Ref. 2:p. 30].

C. IDENFITICATION AND DESCRIPTION OF IAEFA PROCESSES

There are six major processes in the Portuguese Air Force War College (IAEFA). A description of these processes is presented below.

1. Directorate

This process involves the management and the supervising at the highest level of the whole Portuguese Air Force War College (IAEFA). Included in this process are the activities of:

a. Supervising all the activities of the College.
b. Proposing to the CEMFA the nomination of the staff and faculty.
c. Proposing the study plans to the CEMFA for approval.
d. Supervising through the respective directors, the courses that are offered in the College.

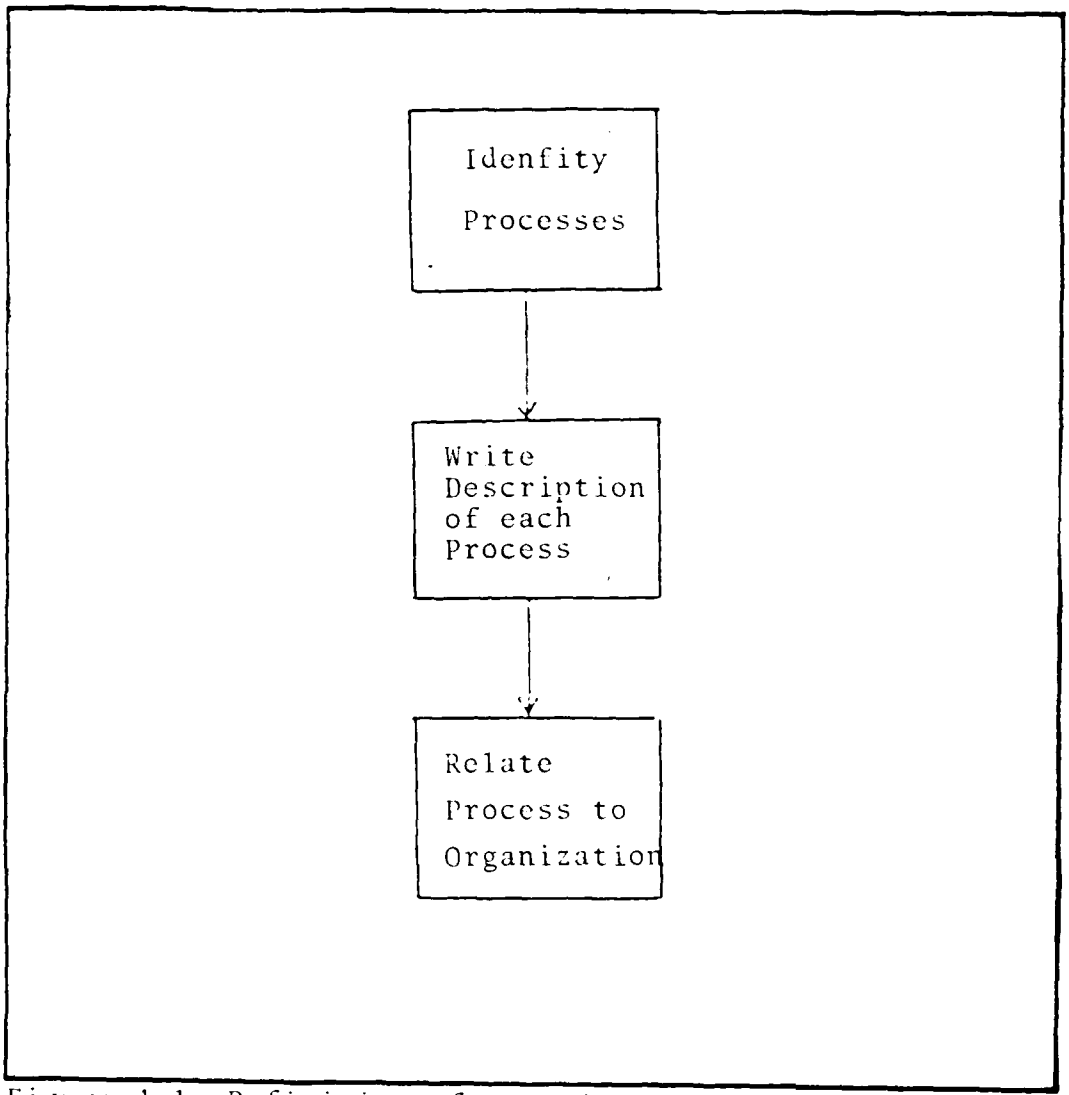

Figure 4.1 Definition of Organization Processes [Ref. 2:p. 30]

e. Promoting the scholar council meetings.

f. Proposing the budgets and supervising their administration.

2. Scholar Council

This process involves the people doing consulting and who are studying the Directorate of the IAEFA in pedagogic and doctrinal subjects. Included in this process are the activities of:

a. Giving advice about teaching philosophy of the courses being planned and the themes of the individual or collective research work of the students.

b. Analysing the subjects put to their deliberation, namely that which is concerned with the students' academic and their attendance in courses.

c. Analysing proposals for the nomination of military and civilian professors and instructors.

3. Academic Department

This process is concerned with the fundamental part of the College for the accomplishment of its mission. Included in this process are the activities related to the duties of the academic department head, the directors of the courses, the assessors of CSGA course, the professors and instructors of CGGA course, the professors and instructors of temporary short courses and seminars, the planning study office head and temporary commissions for specific studies. In what concerns the academic department head, and included in this process, are the activities of: Conducting and coordinating all the pedagogic and doctrinal activities of the IAEFA.

Related to the directors of the courses are the activities of:

a. Elaboration of course matrices.

b. Coordination and orientation of the courses under their leadership.

Related to the assessors of CSGA course are the activities of:

a. Cooperating with the director of the course in programing and coordination of the several areas of study.

b. Keeping the normal performance of the study areas delegated and collaborating in seminars and research work of the auditor officers. Moreover, they have to collaborate with the work of the scholar council and the CSGA council.

Related to the professors and instructors of CGGA course are the activities of:

a. Cooperating with the directors of the course in the programing and coordination of the several study areas.

b. Keeping the normal performance of the study areas delegated.

c. Elaborating manuals and texts, teaching the lessons, colaborating in seminars and resource work of the officers and cooperating with the work of the scholar council and of the CGGA course council.

Related to the professors and instructors of the temporary short courses or seminars are the activities of:

a. Cooperating with the director of the course or seminar in the making of the planning and in the programing and coordination of the actions foreseen.

b. Collecting texts and bibliographies and collaborating in seminars and research work of the officers who attend the course.

Related to the planning study office that is the support organ of the academic department head, are the activities of:

a. Scheduling the school classes, coordinating the use of instruction auxiliars and scheduling the classrooms. Moreover, it must expand study plans, programs, regulations and create other basic documents to orient the new faculty.

b. Elaborating and distributing summaries of the academic activity for historical and statistical purposes; filing all the documentation concerning the school work, namely information about school results, marks, amplified judgement etc.

Lastly, in what concerns the academic department process and is related to the temporary commissions for specific studies, are the activities of performing studies for the organization and the regulations and the principle doctrinal jobs in collaboration with the Air Force General Staff.

4. Support Department Commanding

This process involves the management of the support department area. It is led by a senior officer who has the function of assistant of the IAEFA Directorate and combines these functions with the military security officer of the College.

Included in this process are the activities related to the duties of the support department head, the secretary office head and the translators office head. The activities include:

a. Conducting and coordinating the performance of the sections and their dependent services in order to get the best results from the support branch.

b. Managing the private personnel of the IAEFA, according to the established rules.

c. Executing the tasks of protocol and public relations as determined by the Director of the IAEFA.

d. Following up on the orders coming from the director.

e. Getting monthly from the financial services of the BAI, the status of the budget for the IAEFA and presenting it to the director, after comparing it with the expenses already incurred.

f. Proposing within a reasonable time and in coordination with the financial services of the Air Force Base Number 1 (BA1), the reinforcement of the necessary budget for the normal running of the College.

g. Ask the BA1 for provision of: transports, check outs and repairs of the installations and equipment, the lodging and food or other necessary services to the IAEFA, fully respecting the rules established in the protocol IAEFA/BA1.

h. Write and distribute all the rules related to military security.

i. Supervise the work of the internal service orders of the IAEFA, reviewing and preparing the subjects for publication.

j. Supervise the processing of all correspondence of the College and filing.

k. Expose, share and circulate the communications and orders, according to the rules. Inform the Command about the requests for leave and registers all the leaves and discharges.

l. Conduct and coordinate the translations work requested by the directorate, faculty and library.

5. Academic Support Section

This process includes the management of the means of technical support, indispensible to the scholar activity. It is led by a major or a captain who also coordinates the library and the instruction auxiliary center, through their leaders.

Included in this process and related to the librarian are the activities of:

a. Receiving, classifying and keeping all the publications bought by or offered to the College and the ones published by the academic department in the graphic services section.

b. Cataloging the new books and keeping current the file by subjects necessary for the ready access of books and magazines.

c. Controlling the magazines or other periodic publication in order to receive them regularly; make an informative note, weekly, about the books and magazines received, which will be distributed by the faculty and students.

In what concerns the instruction auxiliar center head, are the activities of:

a. Giving the faculty of the College the instruction auxiliars, the publications they need for classes or other academic work.

b. Verifying the execution of the typing, design and reproduction of documentation, necessary for the courses and seminars.

c. Verifying that all documents produced adhere to the established rules in the regulations manuals giving or asking for each publication, the appropriate order number.

d. Planning in advance, the production of publications giving them priorities to satisfy the needs throughout the school year, in order to ease the graphic services of the BA1.

e. Keeping a register, classified by basic subjects where one can find all the elements of identification in what concerns the support in the section, such as transparencies, diagrams, letters, films.

f. Proposing the acquisition of all auxiliary instruction material needed, according to requests from the faculty and student officers.

6. Logistic Support Section

This process involves the action, coordination and verification of all logistic support, indispensible to the IAEFA, either if this is processed by the Portuguese Air Force War College (IAEFA) or if it is supplied by the Air Force Base Number 1 (BA1). Included in this process are the activities of:

a. Ensuring logistic supplies (transports, lodging, food, equipment, furniture).

b. Requesting the Commander of BAI for the preventive inspections and necessary repairs in the buildings, their equipment and furniture.

c. Making and keeping current the inventory of goods and equipment. Moreover, ensure that all furniture and equipment is in good order.

d. Controlling and registering all the budget expenses and, in contact with the planning study office, foresee the expenses for each course.

D. RELATION OF IAEFA PROCESSES TO THE ORGANIZATION

To relate the IAEFA processes to its organizational structure, a process/organization matrix is provided in Figure 4.2.

Fundamentally, this is a graphic representation of one aspect of the management system of the organization because it shows who makes the decision in each of the processes. The processes and organizational units are arranged on the matrix and this is completed by indicating the degree to which each organizational unit is involved in the processes. The following symbols are used in Figure 4.2 to indicate the degree of involvement:

- ⊠ Major responsibility and decision maker
- ⊠ Major involvement in the process
- ⊘ Some involvement in the process [Ref. 2:p. 33]

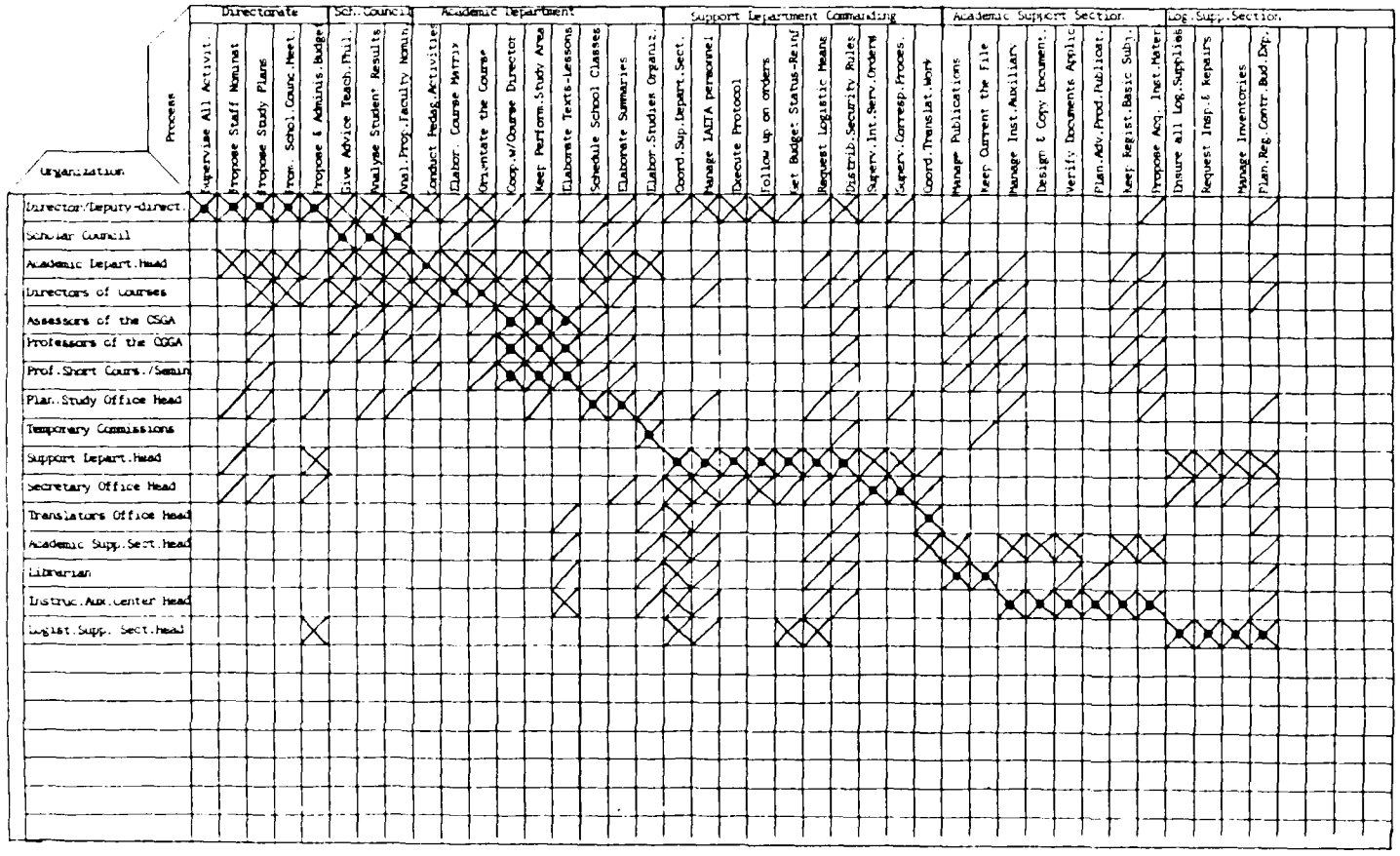

Figure 4.2 Process/Organization Matrix

V. IDENTIFICATION AND DEFINITION OF IAEFA DATA CLASSES

A. WHY DATA CLASSES ARE IDENTIFIED

Once the IAEFA processes have been identified, the next step is to identify the IAEFA's data classes and their relationship to each other.

A data class is a logical grouping of data related to entities that are significant to the organization. Such grouping allows a long-range information architecture to be identified. The data classes represent data that must be available for IAEFA activities and decision making. They should not represent a particular format (e.g., report or display) of how the data is currently being utilized, since this would confuse the existing implementation with the data itself. Data classes are identified in order to:

1. Determine data sharing requirements across processes.
2. Determine data that is necessary but either unavailable or insufficient for IAEFA use.
3. Establish the basis for data policy formulation, including data integrity responsibility [Ref. 2:p. 56].

B. DEFINING IAEFA DATA CLASSES

To enable assignment of responsibility for data integrity, data classes must be defined so that there is one and only one process that creates each data class. Moreover, in data class definition one second step will be to identify what data must be available and what data is created by each IAEFA process.

Figure 5.1 illustrates as an example, how each data class was created. This involves listing each required datum on a table and then showing its progression through a process and finally what data class was created. The instrument used to create the data class is the "data usage analysis sheet" provided by IBM's BSP methodology.

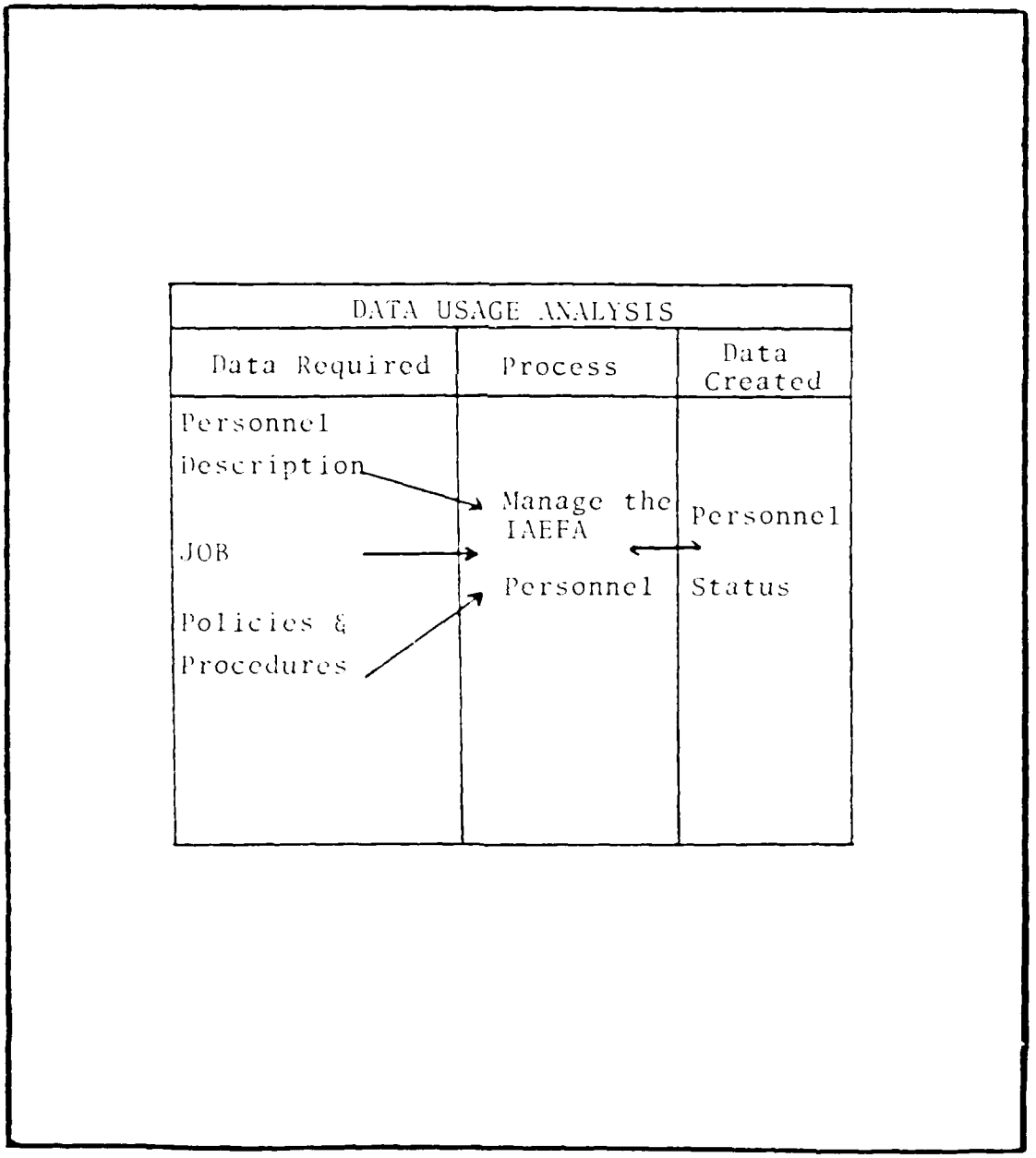

Figure 5.1 Sample Data Usage Analysis Sheet [Ref. 2:p. 37].

VI. DEFINITION OF IAEFA INFORMATION ARCHITECTURE

A. ESTABLISHING THE IAEFA PROCESS/DATA CLASS MATRIX

After identifying the data classes, the relationships between data classes and IAEFA processes must be established. This is done to ensure that:

1. All needed data classes and processes have been identified.
2. One and only one process creates each data class.

The tool used to establish process/data class relationships is the information architecture or process/data class matrix (see Figure 6.1). The steps to create this matrix are the following:

1. The processes are listed down the vertical axis. Begin with the processes of Directorate and Scholar Council. Then, Academic Department; at last, list the processes for managing the supporting resources.
2. The data classes are listed across the horizontal axis. Begin with the first process and list the data classes "created" by this process (a "C" is placed at the intersection of the appropriate process row and data class column). Continue until all data classes are listed. There are 42 data classes in this matrix which is within the 30-60 data classes recommended by the formal methodology. The data classes are created by sequence and grouped by IAEFA entity.
3. Across the row for each process, place a "U" in the column for each data class used by that process.
4. Verify that all required data classes are in the matrix and that each data class has one and only one creating process [Ref. 2:p. 59].

The process/data class matrix becomes an important analytical tool for:

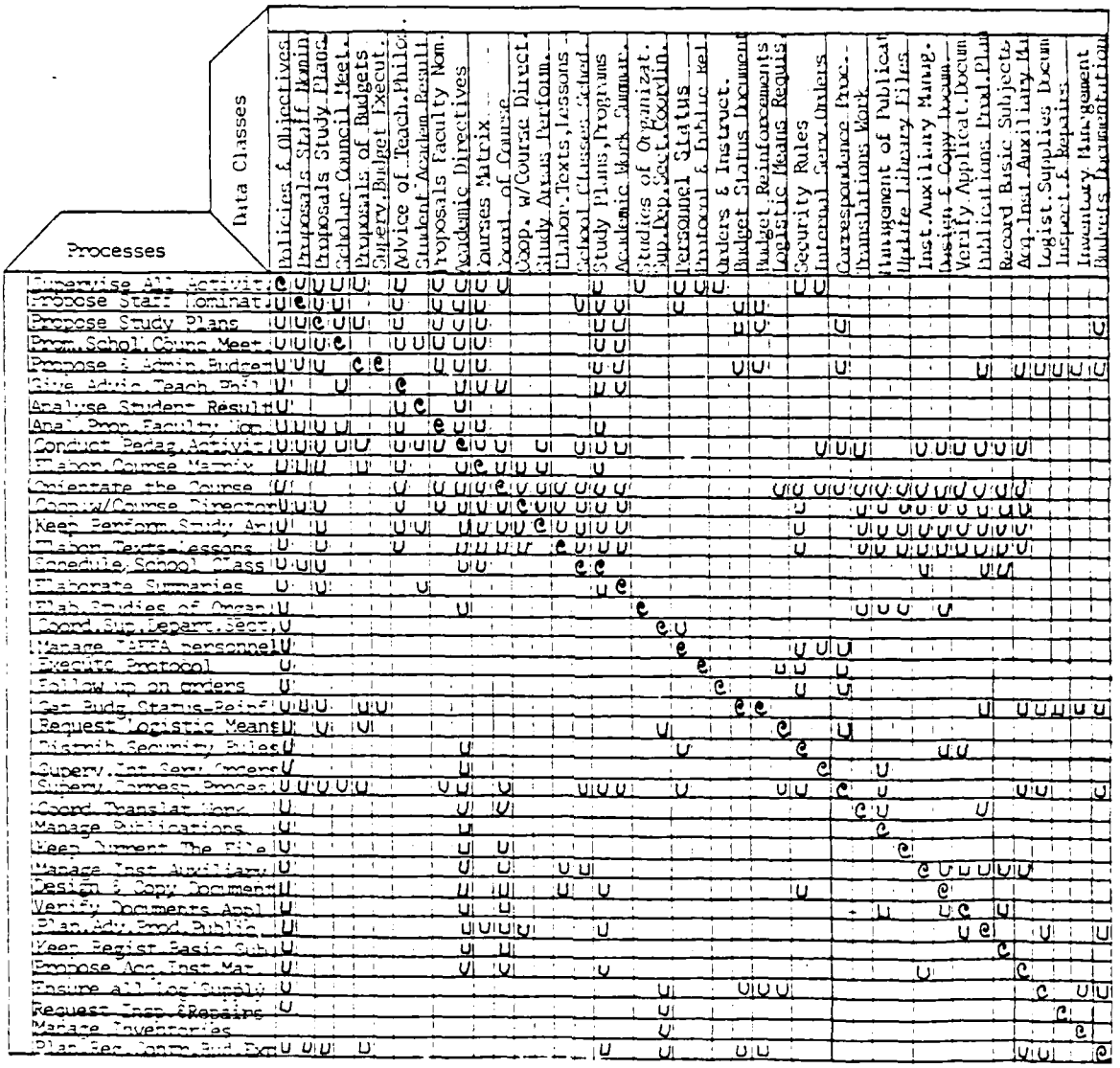

Figure 6.1 IAEFA Process/Data Class Matrix

u = used
c = created

1. Verifying data class identification
2. Communicating data sharing concepts
3. Analysing data problems
4. Determining dependencies between applications in the architecture [Ref. 2:p. 39].

B. DEVELOPING THE INFORMATION FLOW DIAGRAM

The information architecture flow diagram is developed by the following steps:

1. Determine Process Groups

Process groups that have similar patterns of data usage are determined. For each group, identify all the data classes created by the processes in that group. Figure 6.2 is the process grouping diagram for IAEFA.

2. Determine Data Flow Between Process Groups

In this step the flow of data between process groups should be identified. Whenever there is data used by a process and that data is created by a process in some other group, an arrow is drawn from the creating group to the using group. In Figure 6.3, the "Study Plans Proposals" data class is used by the "Schedule School Classes" process, but it created by the "Propose Study Plans" process. This relationship requires that an arrow be drawn showing flow from the group to which "Schedule School Classes" belongs. When all U's are examined and the necessary data flows represented, the result will be a completed data flow diagram (see Figure 6.3).

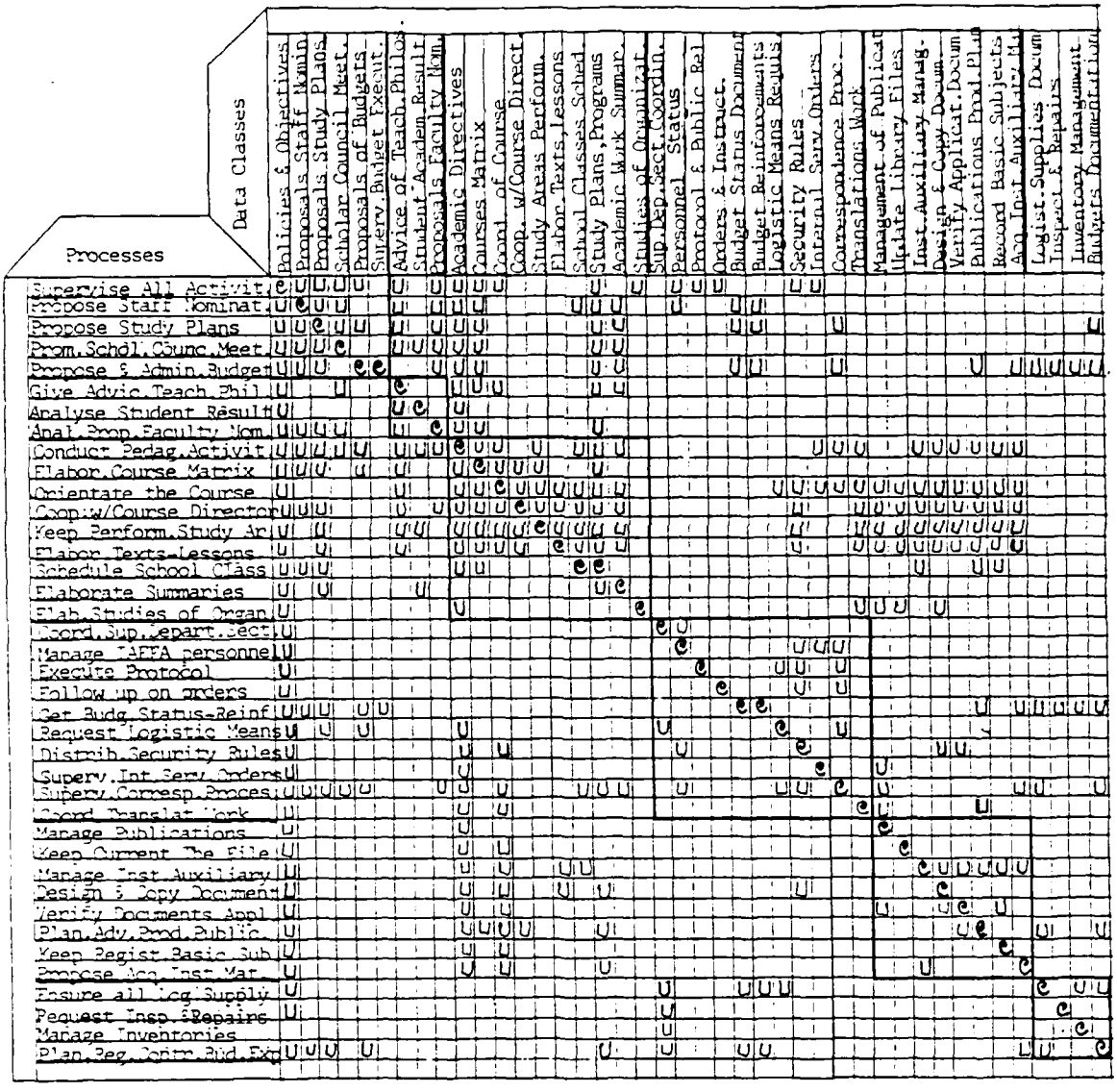

Figure 6.2 IAEFA Process Groupings

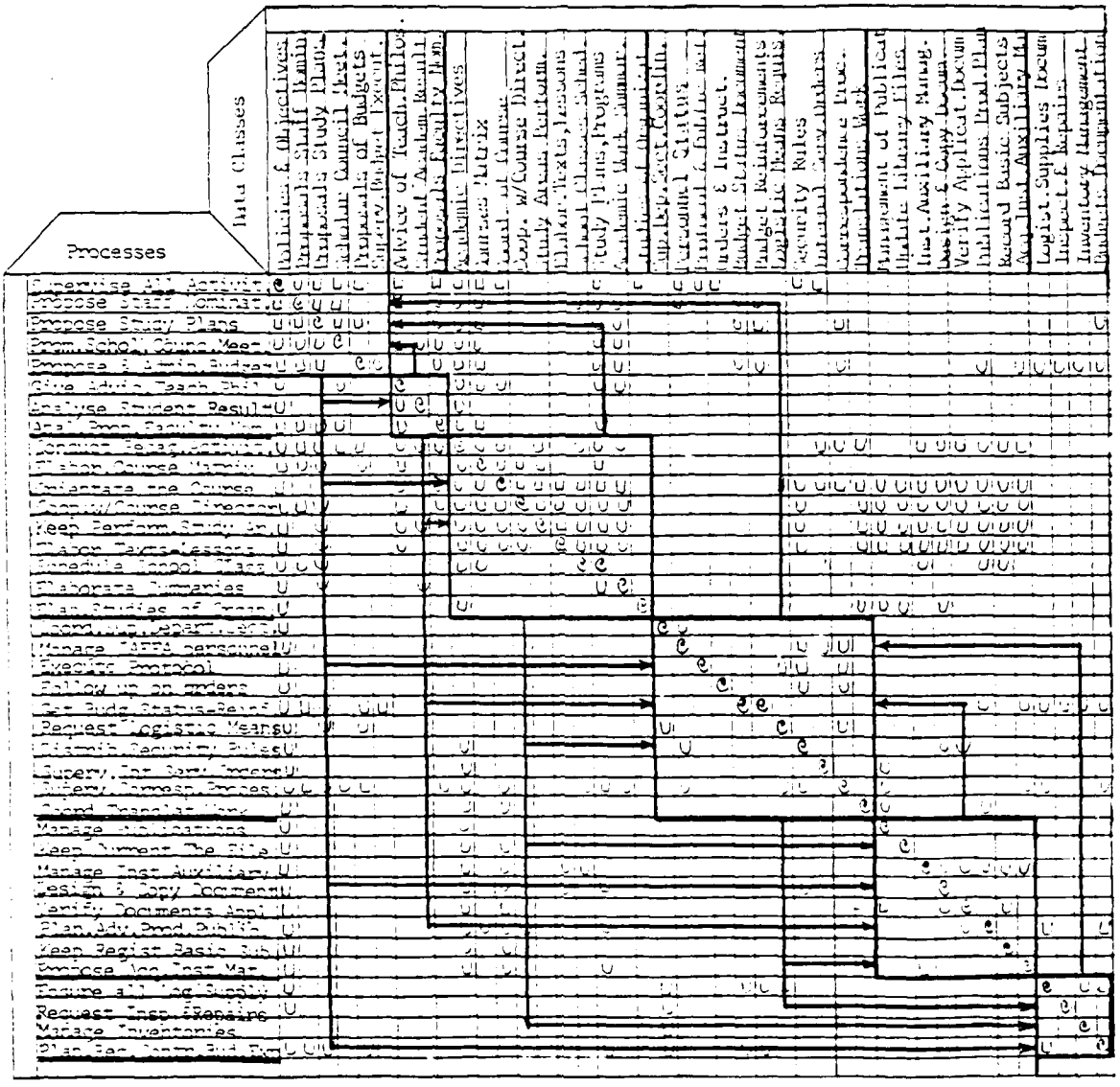

Figure 6.3 IAEFA Data Flow Diagram

5. Simplify and Complete the Data Flow Graphic

a. Simplifying the Graphic

For presentation purposes, the data flow diagram is simplified. The ways to do this simplification are to [Ref. 2:p. 45]:

(1) Remove the C's and U's.

(2) Use two-way arrows.

(3) Move the groups of processes and data classes to conform to the stylized information architecture.

Figure 6.4 is a simplified version of the IAEFA information architecture flow diagram presented in Figure 6.3.

b. The Completed Data Flow Graphic

The IAEFA completed architecture drawing (see Figure 6.4), is a very useful management communication tool because:

(1) It is recommendation for long-range information systems implementations.

(2) It identifies the information systems (the boxes) that form the long-range plan.

(3) It shows the data controlled by each information system (reading vertically).

(4) It shows the IAEFA Processes supported by each information system (reading horizontally).

(5) It shows the flow of information between the various information systems (the lines and arrows) and thus shows the flow of information through the IAEFA itself [Ref. 2:p. 45].

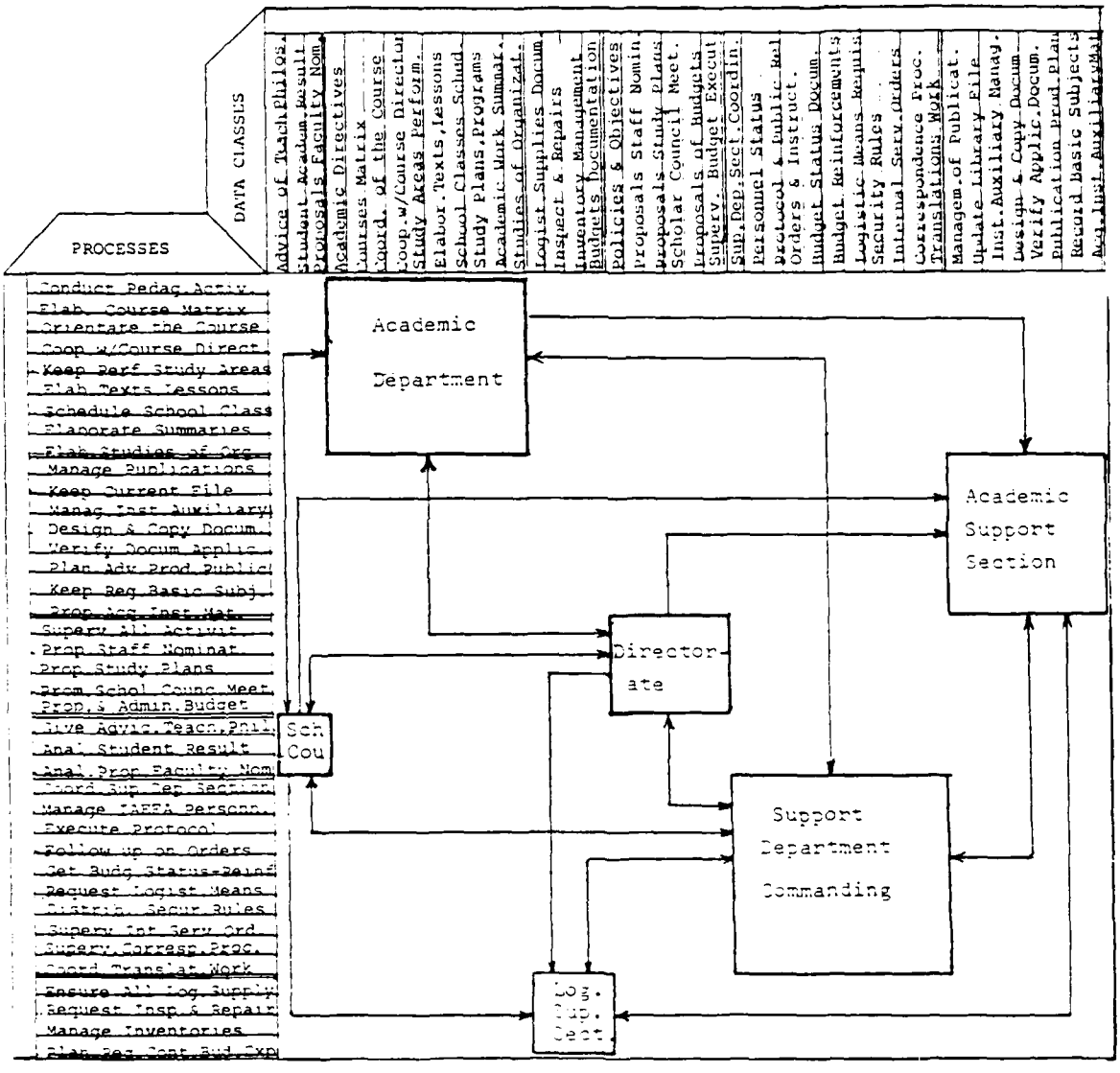

Figure 6.4 IAEFA Information Architecture Flow Diagram

VII. CONCLUSION AND RECOMMENDATIONS

The general area of this thesis research includes strategic management information systems planning, organizational information requirements analysis and the alignment of MIS planning with overall planning and development objectives of the Portuguese Air Force War College (IAEFA). This chapter presents the conclusion and recommendations of the developed effort. Special importance is placed upon that the IBM's BSP is a proper system planning methodology to design an information system architecture for the Portuguese Air Force War College (IAEFA).

A. CONCLUSION

The five most common difficulties experienced in management information systems (MIS) planning are:

1. Alignment of an MIS plan with the overall strategies and objectives of the organization.
2. Design of an information system architecture for the organization as a framework within which applications are to be designed and developed.
3. Allocation of information system development and operations resources among competing applications.
4. Complete projects of information systems on time and on schedule.
5. Selection and use of methodologies to integrate the first four processes [Ref. 3:p. 322].

Business System Planning (BSP) is a comprehensive planning methodology developed by IBM. One of the main strengths is

that of top management involvement. This gives credibility to the study and helps ensure the cooperation of all participants when conducting the study. Management also has more confidence in the systems that result from the study.

BSP forces management to formalize their goals and objectives. By identifying the organizational requirements and developing an information architecture based on those requirements, BSP supports these goals and objectives. The resultant systems developed are more apt to survive managerial and organizational changes because they are based on goals and objectives which rarely change.

Identifying and analysing organizational requirements and processes also allows management to evaluate current information systems as well as assess future information systems needs.

The information architecture developed by BSP allows management to better plan system development, including setting architectural and development priorities and aiding all phases of information resource management. The value of information as a shared organization resource is strengthened by providing for common and consistent data to be used throughout the organization. Also, management can more easily plan for the integration of information systems, independent of organizational structure.

BSP also fosters organization wide communication and awareness of information needs. Applying IBM's BSP to the Portuguese Air Force War College (IAEFA) is a new concept.

Not only is there a possibility that BSP will be a standard in the system planning area, but, it also could be a guide or reference for both the Directorate and department heads of the IAEFA and the designer in the development of a successful information system.

The IAEFA plays a vital role in fulfilling the mission of the Portuguese Air Force, providing the Officers with an in-depth knowledge of war and the military sciences to meet the challenges in today's world. The success of the Computer-based information system will depend upon the use of an existing well defined BSP methodology, the effective involvement of the IAEFA leaders and the knowledge of the IAEFA information designer. The defectiveness of any of these factors will have, certainly, a definite impact on success.

B. RECOMMENDATIONS

Although IBM's Business System Planning (BSP) methodology is superior to other traditional and structured techniques as far as information planning goes, the adoption of any new methodology should be accomplished very carefully. Very complex environments may be difficult to model as processes, entities and data classes. Translating the process/data class matrix into the information flow diagram is not a very straightforward process for even a relatively simple example. It would be even more difficult for a complex one. To do it properly, the organization's personnel must be somewhat

experienced with the methodology. As these types of people don't exist in IAEFA organization, outside help and training is needed. IBM Corporation has, a long time ago, wide acceptance in Portugal, excellent personnel staff and owns the most part of the computer systems market. So, the presented study effort is feasible and the following specific actions are recommended:

1. Establish a steering committee of major IAEFA users. This committee should be composed by representatives of the IAEFA Directorate, Academic Department Head and Support Department Head. Its primary concerns are policy setting, establishing the direction of information use in IAEFA and exercising control mechanisms to ensure that the desired results are achieved.

2. That a BSP expert be hired to act as a consultant/ coordinator to help implement the planning aspects described in this thesis. Naturally, this will require a close coordination between the BSP expert and the Portuguese Air Force War College to take the most advantages offered by the methodology.

3. That as a follow-on activity for the steering committee the projects under development must be evaluated periodically to ensure continuing cost-effectiveness.

LIST OF REFERENCES

1. Portuguese Air Force, Portuguese Air Force War College Regulations, October 1979.

2. IBM, Business System Planning-Information System Planning Guide, Fourth Edition (July 1984).

3. Wetherbe, James C., Systems Analysis and Design: Traditional, Structured and Advanced Concepts and Techniques, Second Edition, West Publishing Company, 1984.

BIBLIOGRAPHY

Ansoff, H.I., "State of Practice in Planning Systems," Sloan Management Review, V. 18, pp. 1-24, Winter 1977.

Anthony, R.N., "Planning and Control System: A Framework for Analysis," Harvard University, 1965.

Davis, G.B., Management Information Systems: Conceptual Foundations, Structure and Development, McGraw-Hill, New York, 1974.

Davis, G.B., "Strategies for Information Requirements Determination," IBM Systems Journal, V.22, No.1, pp. 4-30, 1982.

Drucker, P.F., Management: Tasks, Responsibilities, Practices, Harper & Row, New York, 1974.

Ein-Dor, P., and E. Segev, "Strategic Planning for Management Information Systems," Management Science, V.15, pp. 1631-1641, November 1978.

Gibson, D.G., and R.L. Nolan, "Managing the four stages of EDP Growth," Harvard Business Review, pp. 76-88, Jan-Feb 1974.

McFarlan, F.W., "Problems in Planning the Information Systems," Harvard Business Review, V.49, pp. 74-80, Mar-Apr 1971.

Munro, M.C. and B.R. Wheeler, "Planning, Critical Success Factors and Management Information Requirements," MIS Quarterly, V.4, pp. 27-28, Dec 1980.

Nolan, R.L., "Managing the Crisis in Data Processing," Harvard Business Review, pp. 115-126, Mar-Apr 1979.

Rockart, J.F., "Chief Executives Define Their Own Data Needs," Harvard Business Review, pp. 91-93, Mar-Apr 1979.

Schwartz, M.H., "MIS Planning," Datamation, V.16, No.10, pp. 28-31, Sep 1970.

Wetherbe, J.C., and G.B. Davis, "Developing a Long Range Architecture," Proceedings of the National Computer Conference, AFIPS Press, Anaheim, CA, pp. 261-269, May 1983.

Zani, W.M., "Blueprint for MIS," Harvard Business Review, pp. 95-100, Nov-Dec 1970.

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